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APPENDIX TO HEALTH AND SAFETY PLAN

Project No: 87C2665

Name: Hydrogeological Investigation of DuPont Newport Landfill Newport, Delaware

Activity: Christina River Sediment Sampling

Project Manager: Alfred M. Hirsch, Ph.D.

1.0 INTRODUCTION

This Health and Safety Plan establishes guidelines and requirements for the safety of Woodward-Clyde Consultants' (WCC) field personnel while conducting activities associated with collection of sediment samples from the Christina River offshore from the DuPont Newport Landfill. This Health and Safety Plan addresses specific risks and hazards associated with this task and is appended to the general Health and Safety Plan for all site work. All employees of WCC involved in the field activities associated with this sampling program are required to read the Plan, sign the attached Compliance Agreement, and abide by the provisions herein.

This Health and Safety Plan is based on review of available data and an evaluation of the potential hazards associated with the referenced project. This Plan outlines health and safety procedures and equipment for activities at this site in order to minimize the potential for exposure of personnel to contaminated materials.

1.1 SITE DESCRIPTION

Sampling activities described herein will be conducted in the Christina River adjacent to the DuPont Newport Landfill. The DuPont Newport Landfill is composed of two disposal sites, one on each side of the Christina River adjacent to the DuPont Newport (Holly Run) Plant located on James Street in Newport, Delaware. The

North Disposal Site consists of a 7-acre area between the plant site and the Christina River. The South Disposal Site consists of a 15-acre area directly across the Christina River from the plant and the North Disposal Site. Both disposal sites and the plant are located in the Town of Newport, Delaware.

The two disposal sites have approximately 1,600 feet of shoreline each. At the location of the disposal sites, the Christina River makes a gentle bend from the east towards the south. The river is approximately 200 feet wide at the disposal sites. The shoreline of each disposal site is wooded, and at the southern extremity of the study area becomes lowlands and tidal marsh.

The Christina River is a calm, low velocity flow which is a tributary to the Delaware River. Because of its proximity to the Delaware Bay, tidal fluctuations of greater than 5 feet are observed in the vicinity of the sites.

1.2 WORK DESCRIPTION

A single sampling program is to be conducted in the area of the Christina River adjacent to the North and South Disposal areas of the DuPont Newport (Holly Run) Plant in Newport, Delaware. Bottom sediments will be collected and submitted for chemical analysis.

The bottom sediment sampling program on the Christina River will be conducted over a period of one week and this program will involve collection of samples utilizing the floating vibracore platform. The bottom sediments will be collected to a depth of 5 feet using the vibracore and sample barrel equipped with a polybutyrate liner. Sediment material retrieved in the liners will be sectioned into 0- to 1-foot, 2- to 2.5-foot, and 4- to 4.5-foot depth intervals. The sampled material contained by the sectioned liner segments will be extruded from the liners, disected to expose unadulterated sediments, and the materials will be scooped into sample shipping containers. All unused portions of samples will be discarded.

Sampling will be conducted at three widely spaced locations on the Christina River. These locations are simply upstream of the disposal sites, between the disposal sites, and downstream of the disposal sites. There will be two sample stations spaced 50 feet apart on the river centerline at each sample location. Sectioning the recovered material into the depth intervals specified above at each station will yield a total of 18 samples for the entire program.

1.3 PERSONNEL HAZARD ASSESSMENT

The scheduled field work for this project involves sampling of and contact with natural materials occurring beneath the river bottom. Specific chemical hazards associated with the sampling of natural materials includes potential exposure to heavy metal and/or organic compounds in contaminated sediments, and volatile organic vapors. Exposure and risk due to organic vapors and organic compound contaminated sediments is expected to be very low, based on available data. There is some potential for low-level radiation exposure at this site. Physical hazards associated with this investigation include falling off the support boat or vibracore barge, the boat turning over due to excessive weight on one side, and heat stress.

The following is a summary of the potential pathways and associated preventive measures for each of the possible chemical and radiation hazards discussed in the previous paragraph.

- **Exposure to Heavy Metal Contaminated Sediments:** WCC personnel may be exposed to heavy metal contaminated sediments during the collection of samples. The principal route of exposure would be skin or eye contact with contaminated fluids or sediments. This exposure route will be minimized by personnel wearing polylaminated Tyvek coveralls, and inner and outer chemically-resistant gloves and boots. In addition, hard hats and eye protection will be worn at all times.

  As the sampling equipment is pulled from the fluids, the outside of the casing will be wiped down to minimize the volume of fluids which falls

within the boat or on personnel.

- **Exposure to Organic-Compound-Contaminated Sediments:** WCC personnel may be exposed to contaminated sediments during the same activities discussed previously, although available data suggest that the risk is not great. The principal routes of exposure would be similar except that some of the organic compounds can break down normal chemically-resistant materials within a relatively short period of time. As the hands will probably have the most contact with the contaminated sediments, a double layer of gloves will be worn by all personnel handling the samples and sampling equipment. The inner glove will consist of an inner glove of latex while the outer glove will be of nitrile. A second outer glove of neoprene will be worn to prevent abrasion damage and potential routes of exposure through inner gloves.

- **Exposure to Organic Vapors:** The inhalation of volatile organic compounds presents the least of the potential hazards at this site. The disturbance of the subaqueous materials by the sampling equipment may cause the volatilization of organic compounds if they are present and these could be released to the atmosphere when the equipment is extracted. All personnel involved in sampling will be equipped with at least half-face respirators equipped with cartridges rated for organic vapor and acid gas. These respirators need not be worn unless air monitoring indicates a need; however, they must be accessible at all times.

Specific chemical hazards associated with the sampling activities may include potential exposure to organic compounds such as tetrachloroethylene and trichloroethylene. To provide monitoring of volatile organic compounds, a Century organic vapor analyzer (OVA), AIDS Model 580, or HNU with 11.7 probe, will be continuously operating during all sampling activities. In the event the organic vapor monitoring equipment indicates that total volatile organic concentrations exceed 5 ppm above background, all personnel will be required to wear respirators. If total

volatile organic concentrations exceed 10 ppm in the breathing zone, the survey area will be temporarily evacuated and a reassessment of breathing protection will be undertaken.

- **Exposure to Radiation:** The potential exists that personnel involved with sediment sampling may be exposed to low-level radiation. Specifically, thorium compounds were used at the plant for the manufacture of pigments and consequently were disposed of at the site. Based on available data, this risk is considered to be minimal. To provide monitoring for personnel exposure to radiologic hazards, samples of sediment retrieved will be scanned for radioactivity using a portable radmeter. If such monitoring indicates a radioactivity level of 0.5 mR/hr above background, the sample will be discarded and personnel will immediately doff any contaminated articles. These articles will be segregated and bagged for separate disposal.

The following is a summary of the preventive measures for the possible physical hazards:

- **Man Overboard:** Sampling operations will be conducted over water from a sampling barge with support boat. The potential for a WCC employee falling overboard from the barge is minimal, as the deck is a non-skid surface and rope railings have been constructed around the perimeter of the barge. In any event, a Coast Guard approved ring bouy with 90 feet of rope attached will be kept onboard at all times. Life preservers must be onboard and available at all times.

- **Support Boat Overturning:** The potential for the support boat overturning is minimal, as all sampling operations are conducted from the barge. However, all personnel onboard the support boat will wear Coast Guard approved life preservers.

- **Heat Stress:** Heat stress is anticipated to be the greatest single physical hazard at the site due to the season in which the work is being performed. Temperatures are expected to be in the 90-degree range. Therefore, the following actions will be taken to mitigate the possibility of heat stress:

  - Electrolyte solutions and cool drinking water will be available at the site support vehicle.

  - Tyvek clothing, gloves, and taped joints will only be required at those times that the sample crew are in contact or exposed to sediment samples or contaminated equipment.

  - These guidelines will be followed:

    a. At temperatures greater than 90 degrees, work time in Tyvek suits is limited to 30 minutes.

    b. At temperatures between 85 and 90 degrees, work time in Tyvek suits is limited to 45 minutes.

    c. At temperatures between 80 and 85 degrees, work time in Tyvek suits is limited to one hour.

2.0 GENERAL HEALTH AND SAFETY PRACTICES

The Project Manager and/or Site Safety Officer will hold a meeting of all field personnel prior to commencing field work. During that meeting all personnel will be provided with a copy of this Health and Safety Plan. The Plan shall be reviewed and discussed and questions will be answered. Prior to any site work, all field personnel will undergo a physical examination, health and safety training, and instruction on personal protective equipment and site emergency procedures. These are explained more fully in the following subsections.

A Site Safety Officer will be present on-site at all times during the sampling activities. Mr. Richard C. Karr has been designated the Site Safety Officer for this task.

2.1 MEDICAL SURVEILLANCE

Prior to field and laboratory work, all WCC personnel will be required to take a WCC-approved medical examination. This requirement is waived for those individuals who have taken the examination during the past 12 months.

2.2 HEALTH AND SAFETY TRAINING

All WCC personnel engaged in field operations will receive training in chemical hazards, safe operating procedures, and the use of protective clothing and equipment. All WCC personnel are required to have successfully completed a WCC-approved Health and Safety Training Course prior to working in the field.

2.3 PERSONAL PROTECTIVE EQUIPMENT

Protective equipment for personnel engaged in field operations at the Christina River Site are listed below. The following equipment will be available to and worn by all personnel involved in monitoring and sampling operations:

- Disposable polylaminated Tyvek suit
- Chemical splash goggles or safety glasses
- Nitrile chemically-resistant gloves (outer)
- Latex chemically-resistant gloves (inner)
- Neoprene gauntlets
- Waterproof rubber PVC or nitrile boots
- Half-face respirator with cartridges rated for organic vapor and acid gas with particular filters (as needed, in accordance with Section 1.3)
- Life preservers or other emergency flotation device

Gloves will be taped to the sleeves of the Tyvek suit and boots will be taped to the leg of the suit during contact with sediment material and contaminated equipment.

2.4 DECONTAMINATION

Personnel decontamination will be performed following sampling with a first wash performed onboard the barge. Gloves and boots will be decontaminated by scrubbing with a solution of alconox and water followed by water rinses. Buckets and tubs will be available for boot and glove decontamination; clean water and soap will be available for personnel to wash their hands and face. Tyvek suits and other disposable safety supplies will be disposed of in trash bags and left at the DuPont plant site.

Decontamination of personnel and primary decontamination of sampling equipment will take place in the contamination reduction zone shown on Figure 1. Personnel and equipment may not pass from the exclusion to the support zone without passing through the contamination reduction zone.

Equipment that comes into contact with contaminated materials will be decontaminated at the site support vehicle between sampling stations or when required before leaving the contamination reduction area. Sampling equipment decontamination will consist of steam cleaning.

To ensure that containers and vehicles used to transport samples to the analytical chemistry laboratory do not become contaminated during transport, samples shall be placed in liquid-tight jars which will be sealed after receiving samples. The exterior of the sampling jars shall be decontaminated using a solution of alconox and water prior to being transferred into clean coolers.

2.5 FORBIDDEN PRACTICES

The following practices are expressly forbidden within the exclusion and contaminant reduction areas:

- o Smoking, chewing (gum, tobacco, etc.), eating, or drinking while engaged in sampling activities on the vibracore platform
- o Wearing facial hair that interferes with the proper fit of respiratory protection devices

2.6 DOCUMENTATION

A daily log will be maintained to record the following information:

- o Date and time of personnel and site visitor entries and exits
- o Accidents, injuries, and illness
- o Incidents of safety infractions by field personnel
- o Air monitoring results
- o Radiation monitoring results

Personnel responsible for implementing the Health and Safety Plan are the Project Manager and the Site Safety Officer. Their specific responsibilities and authority are described in WCC's Hazardous Waste Health and Safety Manual.

3.0 EMERGENCIES

WCC will be using a minimum three-man crew during all sampling operations. A support boat will be available at all times for crew transport to shore. In the event of a minor injury, i.e., a cut finger, the members of the sampling crew can transport the injured party to shore where, depending upon the extent of the injury, the individual can receive first aid at the site support vehicle (SSV) or be taken where additional aid can be administered.

The scenario for more serious accidents, i.e., a sampling technician falling overboard, the sampling crew members will initiate a rescue, transport the individual ashore, and make an assessment as to the need for additional assistance. Should additional assistance be needed, the injured individual can be transported in the site vehicle or one member can reach a telephone for professional assistance.

Appendix A lists the telephone numbers of plant security services. Figure 1 presents the route to the nearest plant telephone. It is understood that DuPont personnel have awareness of the telephone numbers and locations of local emergency services, including the fire department, police department, and local hospitals. Figure 2 shows the route to the nearest hospital.

4.0 PROJECT PERSONNEL

Personnel authorized to work on this site are:

Project Manager:	Alfred M. Hirsch, Ph.D.
Corporate Health and Safety Officer:	Phillip L. Jones
Office Health and Safety Officer:	Robert G. Ehlenberger
Site Safety Officer:	Richard C. Karr
Technicians:	Albert Stockel
	Andrew B. Long

5.0 SAFETY PLAN APPROVAL

Phillip L. Jones, Corporate Health & Safety Officer — Date 6/16/87

Robert G. Ehlenberger, Plymouth Meeting Office — Date 6/16/87

Alfred M. Hirsch, Ph.D., Project Manager — Date 6/16/87

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HEALTH AND SAFETY PLAN
COMPLIANCE AGREEMENT FORM

Project: Christina River Sediment Sampling

Client: DuPont Newport (Holly Run) Plant
Newport, Delaware

Activity: Offshore Sediment Sampling for Chemical Analysis

I, _____, have received a copy of the Health and Safety Plan for the above-referenced project. I have read the Plan, understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the safety requirements specified in the Plan.

SIGNED:

_____ _____
(Signature) (Date)

Firm: _____

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Figure

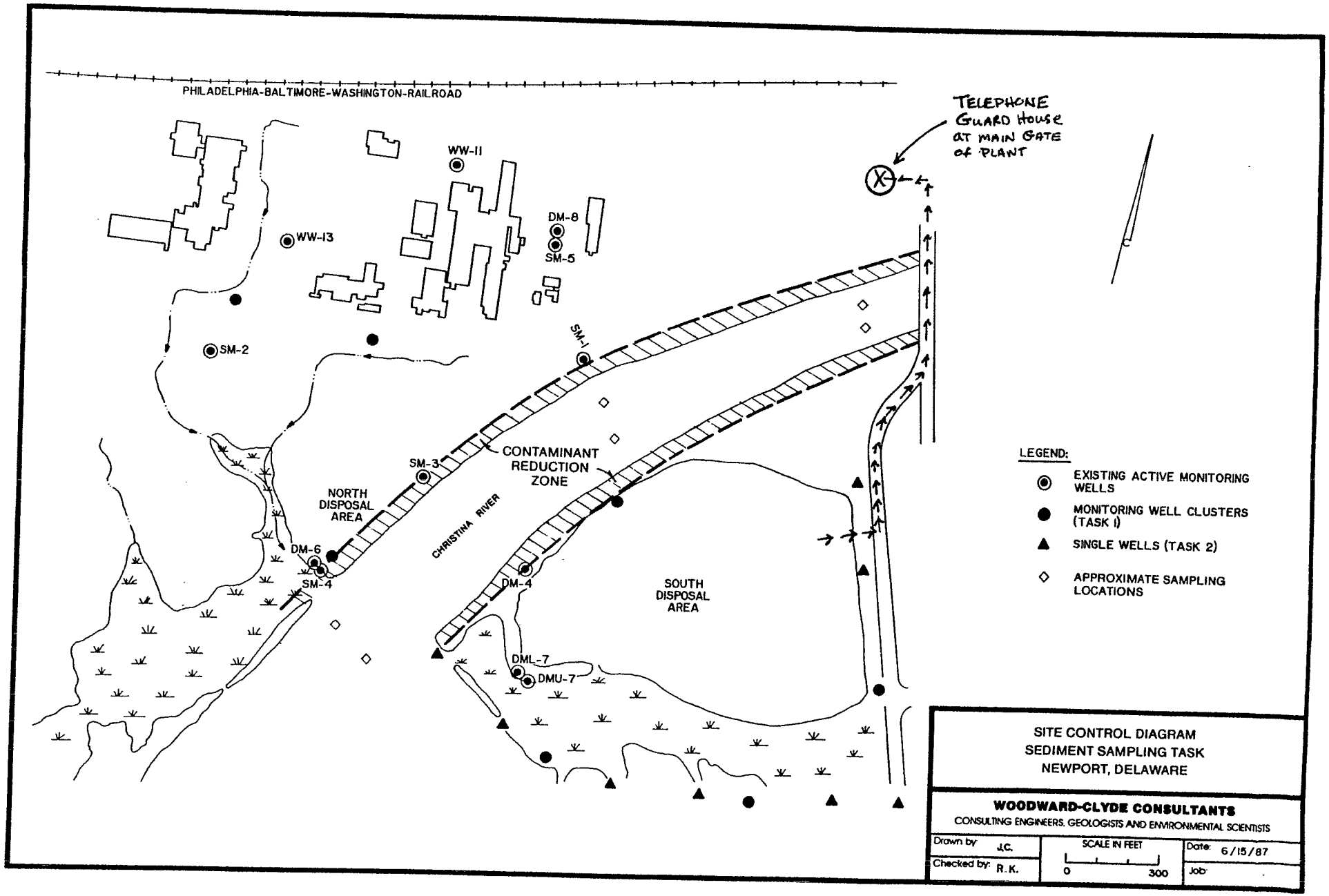
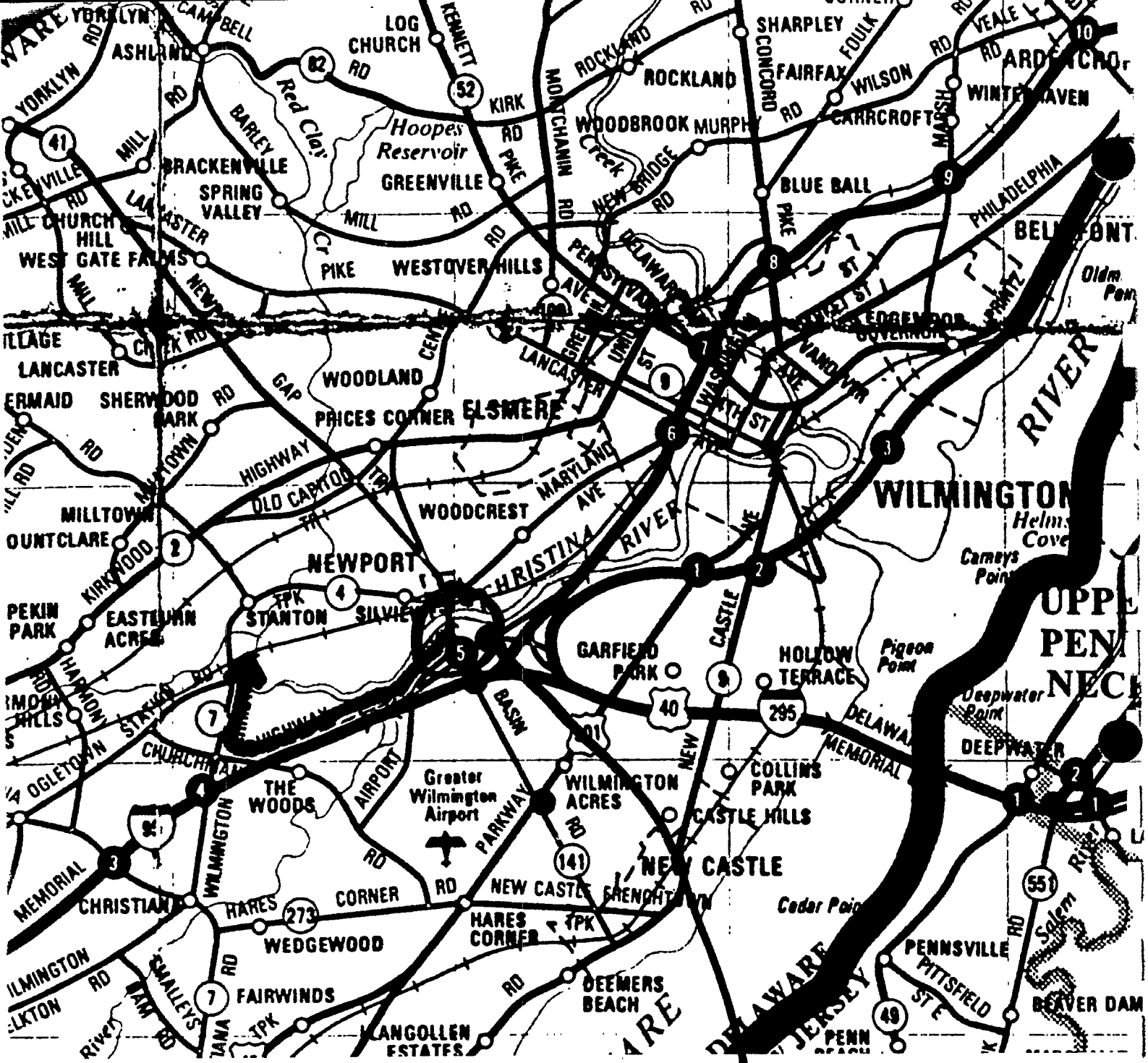


FIGURE 1



ROUTE to NEAREST Hospital →

300466

FIGURE 2

Appendix

APPENDIX A

EMERGENCY TELEPHONE NUMBER

Main Gate Guard House	(302) 992-5730

Attachments

WOODWARD-CLYDE CONSULTANTS
HAZARDOUS WASTE MANAGEMENT PRACTICE
HAZARDOUS MATERIAL SITE/LABORATORY
INCIDENT/ACCIDENT REPORT

Date: _____ Reporter's Name: _____

Project No.: _____ Title: _____

Project Manager: _____ Business Unit: _____

NATURE OF ACCIDENT/INCIDENT

Date of Occurrence: _____

Type: Fire _____ Flash _____ Explosion _____ Injury _____ Illness _____

Auto Accident _____ Other (specify) _____

Known or Possible Cause: _____

_____

_____

Was an infraction of safety plan requirements involved: Yes _____ No _____

IDENTITY OF INJURED/SICK PERSONNEL

Name	Affiliation	Nature of Injury/Illness

PROPERTY DAMAGE (describe items and extent of damage)

_____

_____

_____

FIGURE 2-2. INCIDENT/ACCIDENT REPORT FORM.

WOODWARD-CLYDE CONSULTANTS
HAZARDOUS WASTE MANAGEMENT PRACTICE
HAZARDOUS MATERIAL SITE/LABORATORY
INCIDENT/ACCIDENT REPORT, CONTINUED

PUBLIC INVOLVEMENT (state if public sector was affected and how)

ACTION TAKEN (describe emergency response procedures used)

RESULTS OF ACTION (describe current situation)

SUGGESTED PREVENTATIVE MEASURES

Reporter's Signature: _____

WOODWARD-CLYDE CONSULTANTS
HAZARDOUS WASTE MANAGEMENT PRACTICE
HAZARDOUS MATERIAL SITE/LABORATORY
INCIDENT/ACCIDENT REPORT, CONCLUDED

DISTRIBUTION

Name	Title
_____	Corporate Health and Safety Officer
_____	Group Health and Safety Officer
_____	Unit Health and Safety Officer
_____	Managing Principal, Operating Group
_____	Manager, Business Unit
_____	Group/Unit Personnel Manager

Note: Incident/accident reports must be distributed within 24 hours after occurrence of each accident/incident.